Considerations on the Use of Visual Tools in Planning Processes: A Brazilian Experience

TeMA

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This special issue collects a selection of peer-review papers presented at the 8th International Conference INPUT 2014 titled "Smart City: planning for energy, transportation and sustainability of urban systems", held on 4-6 June in Naples, Italy. The issue includes recent developments on the theme of relationship between innovation and city management and planning.

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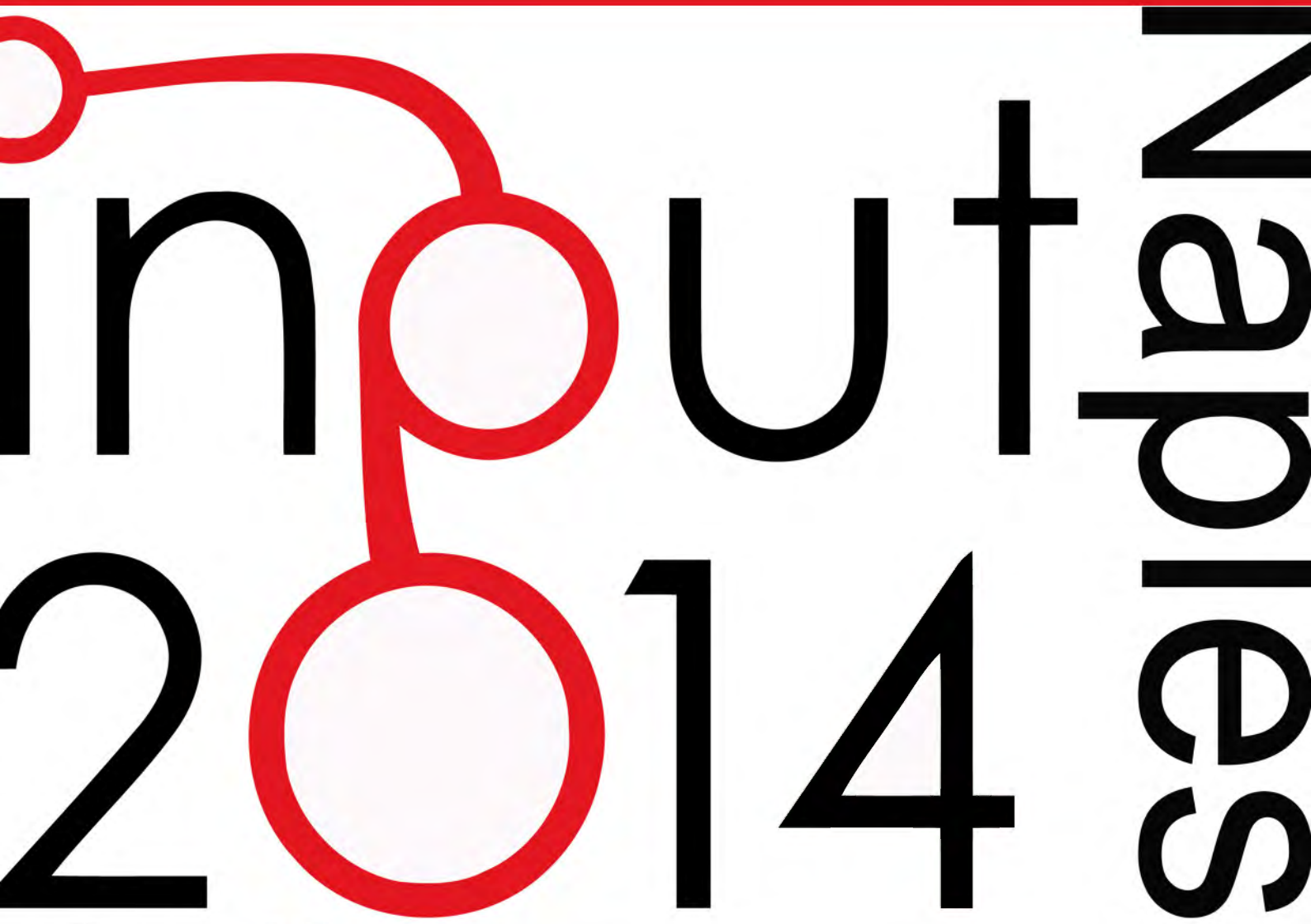

Smart City

planning for energy, transportation and sustainability of the urban system

Special issue, June 2014

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SMART CITY

PLANNING FOR ENERGY, TRANSPORTATION AND SUSTAINABILITY OF THE URBAN SYSTEM

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Laboratory of Land Use Mobility and Environment
DICEA - Department of Civil, Architectural and Environmental Engineering
University of Naples "Federico II"
Piazzale Tecchio, 80
80125 Naples
web: www.tema.unina.it
e-mail: redazione.tema@unina.it

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TeMA Journal of Land Use, Mobility and Environment

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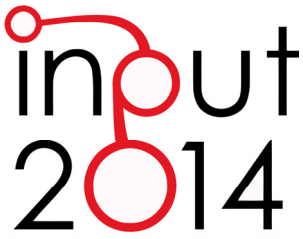

TeMA Journal of Land Use, Mobility and Environment

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EIGHTH INTERNATIONAL CONFERENCE INPUT 2014

SMART CITY. PLANNING FOR ENERGY, TRANSPORTATION AND SUSTAINABILITY OF THE URBAN SYSTEM

This special issue of TeMA collects the papers presented at the Eighth International Conference INPUT, 2014, titled "Smart City. Planning for energy, transportation and sustainability of the urban system" that takes place in Naples from 4 to 6 of June 2014.

INPUT (Innovation in Urban Planning and Territorial) consists of an informal group/network of academic researchers Italians and foreigners working in several areas related to urban and territorial planning. Starting from the first conference, held in Venice in 1999, INPUT has represented an opportunity to reflect on the use of Information and Communication Technologies (ICTs) as key planning support tools. The theme of the eighth conference focuses on one of the most topical debate of urban studies that combines , in a new perspective, researches concerning the relationship between innovation (technological, methodological, of process etc..) and the management of the changes of the city. The Smart City is also currently the most investigated subject by TeMA that with this number is intended to provide a broad overview of the research activities currently in place in Italy and a number of European countries. Naples, with its tradition of studies in this particular research field, represents the best place to review progress on what is being done and try to identify some structural elements of a planning approach.

Furthermore the conference has represented the ideal space of mind comparison and ideas exchanging about a number of topics like: planning support systems, models to geo-design, qualitative cognitive models and formal ontologies, smart mobility and urban transport, Visualization and spatial perception in urban planning innovative processes for urban regeneration, smart city and smart citizen, the Smart Energy Master project, urban entropy and evaluation in urban planning, etc..

The conference INPUT Naples 2014 were sent 84 papers, through a computerized procedure using the website www.input2014.it . The papers were subjected to a series of monitoring and control operations. The first fundamental phase saw the submission of the papers to reviewers. To enable a blind procedure the papers have been checked in advance, in order to eliminate any reference to the authors. The review was carried out on a form set up by the local scientific committee. The review forms received were sent to the authors who have adapted the papers, in a more or less extensive way, on the base of the received comments. At this point (third stage), the new version of the paper was subjected to control for to standardize the content to the layout required for the publication within TeMA. In parallel, the Local Scientific Committee, along with the Editorial Board of the magazine, has provided to the technical operation on the site TeMA (insertion of data for the indexing and insertion of pdf version of the papers). In the light of the time's shortness and of the high number of contributions the Local Scientific Committee decided to publish the papers by applying some simplifies compared with the normal procedures used by TeMA. Specifically:

- Each paper was equipped with cover, TeMA Editorial Advisory Board, INPUT Scientific Committee, introductory page of INPUT 2014 and summary;
- Summary and sorting of the papers are in alphabetical order, based on the surname of the first author;
- Each paper is indexed with own DOI codex which can be found in the electronic version on TeMA website (www.tema.unina.it). The codex is not present on the pdf version of the papers.

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CONSIDERATIONS ON THE USE OF VISUAL TOOLS IN PLANNING PROCESSES

A BRAZILIAN EXPERIENCE

CAMILA ZYNGIER[a], STEFANO PENSA[b], ELENA MASALA[c]

[a]Laboratório de Geoprocessamento – Escola de Arquitetura – UFMG – Belo Horizonte, BR
e-mail: camila.zyngier@gmail.com
URL http://geoproea.arq.ufmg.br/

[b]SiTI - Higher Institute on Territorial Systems for Innovation –Torino, IT
e-mail: stefano.pensa@polito.it
URL: http://www.siti.polito.it

[c]SiTI - Higher Institute on Territorial Systems for Innovation –Torino, IT
e-mail: elena.masala@polito.it
URL: http://www.siti.polito.it

ABSTRACT

This paper assumes that citizen participation does not really happen in relation to current urban planning practice for a number of reasons. First of all, many planning processes do not involve citizens as ideally they should. Secondly, although if they involve citizens, many planning processes are not able to communicate them the actual questions to deal with. Thirdly, many citizens have not a sufficient knowledge or ability to understand the planning issues. Therefore, the paper supposes that the use of visual interfaces can collaborate to organize data and improve the involvement of citizens within planning processes. Focusing on the Brazilian reality, the case study present two selected areas with great relevance for the Metropolitan Region of Belo Horizonte's (MRBH): Santa Lúcia, within the municipality of Belo Horizonte, and the neighborhood Vale do Sereno, in the Nova Lima municipality. The areas result under a great pressure and intensification of anthropic interventions, containing consolidated occupancy. The example on the two areas shows how urban planning still lacks a systematization of data. This also implies that the two municipalities not consider the communication of information as a priority for developing cities. Although current information technology can offer advantages for implementing the planning processes though visual languages, harder efforts are required to build the communication process between people, including communication as part of the planning process.

KEYWORDS

PSS, sDSS, visualization, communication, participation

1 INTRODUCTION

This paper assumes that citizen participation does not really happen in relation to current urban planning practice for a number of reasons. First of all, many planning processes do not involve citizens as ideally they should. Secondly, although if they involve citizens, many planning processes are not able to communicate them the actual questions to deal with. Thirdly, many citizens have not a sufficient knowledge or ability to understand the planning issues. Therefore, the paper supposes that the use of visual interfaces can collaborate to improve the involvement of citizens within planning processes.

The communication of values and urban parameters that shape the urban landscapes should preferably be the result of a community consensus, while they are actually the outcome of a sum of variegate interpretations by citizens. In this context, the key question focuses on investigating firstly how investments in communication and visualization for knowledge building can actually be an answer to extend the understanding and perception of citizens about urban landscape and, secondly, how visualization can improve the communication so that the urban landscape shaped by urban parameters can deal with the idea of city given by citizens.

As shown by van Wijk (2005), the visualization enables a process of dialogue between users and data, thus increasing the possibilities of approval with maximized consensus and the establishment of collective responsibility (fig. 1). A better communication and visualization of spatial data can be an answer to extend the understanding and perception of citizens on their landscape vision. Meanwhile, this also improve the awareness of users about possible scenarios and future landscapes, so that the management of the designed landscape can be the outcome of a reasoned and shared discussion.

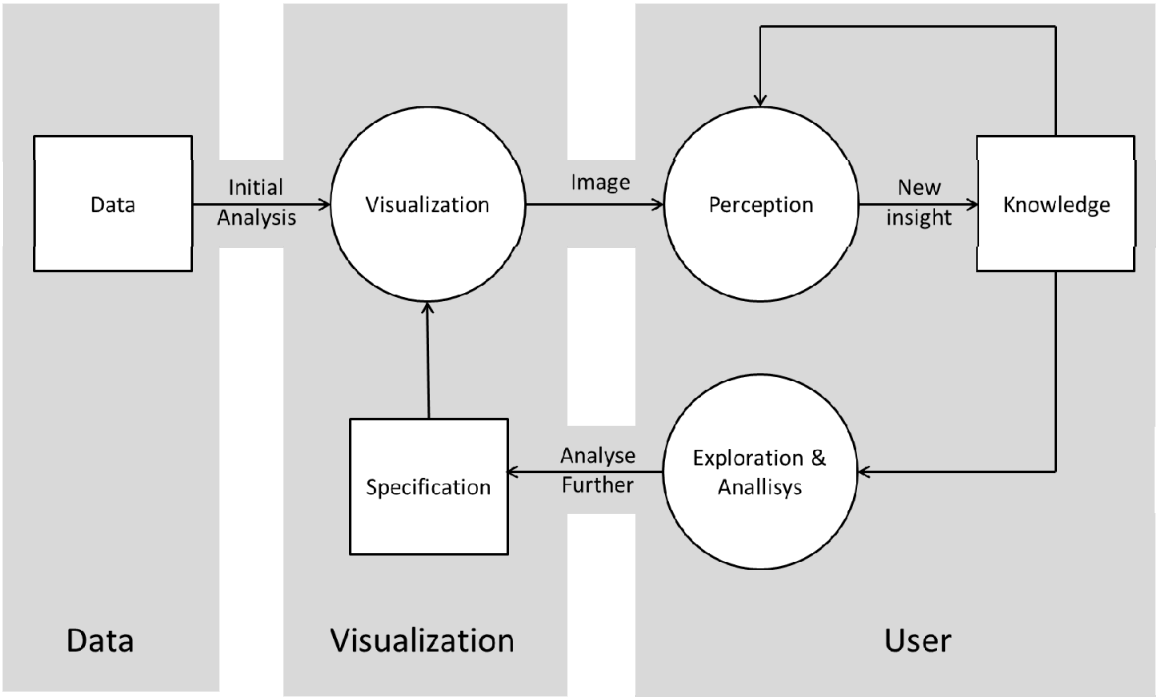

Fig. 1 Visualization model and its components

At the moment, planning actions and urban management are characterized by a general lack of information being replaced by data overload. However, *data* and *information* are not interchangeable concepts. In fact, data becomes information only when it is structured, systematized and made available for the interpretation of users (Moura, 2003). Thus, the availability of Land Use Policies texts or shapefiles in the Web is not

enough to promote the real understanding of a community. Although the media is open, in these cases the information is encrypted and accessible only to technicians who are able to interpret and understand the data. Focusing on the Brazilian reality, this paper considers how urban planning still lacks a systematization of data. Despite the use of GIS (Geographic Information System) is already fully capable of being distributed and used at national level, despite some data collections have open access and many softwares have free and/or Portuguese translations, the country does not make use of Planning or spatial Decision Support Systems (PSS / sDSS).

PSS and SDSS promote the handling of information in a systemic way and have significant potential for communication. Thus, considering the visualization as a visual framework for the organization of data (Masala, 2014), the paper aims at highlighting how the combination of support systems with visual tools can improve the communication among people, increasing the possibilities for interoperability, enabling the dialogue among stakeholders and favoring the orchestration of planning processes.

2 THE USE OF A VISUAL LANGUAGE FOR IMPROVING THE COMMUNICATION VALUE OF PSS AND SDSS

This paper considers that Planning and spatial Decision Support Systems (PSS and sDSS) outputs can deal with the purpose of communication within planning processes. However, PSS and SDSS present a multitude of definitions so that, after a kaleidoscopic review, Geertman and Stillwell (2003, 2009) indicates that although there is not a rigorously definition of PSS at the time – conclusion also reached by Klosterman and Pettit (2005) – all settings tend to coincide with or addressing the same kind of functionality required within this category of support instruments.

In fact, on the one hand the term Planning Support Systems dates back to the 1950s, specifically to the approach presented by Britton Harris, in which planning and sketch planning were combined to allow rapid and partial description of alternatives (Geertman and Stillwell, 2003). On the other hand, the PSS is a relatively recent phenomenon, emerging in the planning stage in the mid-1990s as presented in the works of Batty (1995) and Klosterman (1997) and resumed in Geertman and Stillwell (2009). In fact, during the last decade, the PSS emerged as an extension technology, information and communication for Geographic Information Systems in planning, combining geospatial tools and information structures to support planning processes or sub-processes in spatial scales and planning contexts specifically defined.

PSS are capable of rationalizing, systematizing and supporting the decision-making processes, both as a structure and a method of holistic view. PSS are also models that manage and allocate data, tasks and actors, allowing, for example: the evaluation of models and impacts; the building of a methodological plan that can be viewed generally or in parts; the view of scenarios and levels of concordance. They are able to generate reports that give feedbacks when there is interoperability between subsets to the system and a responsive interaction (Sharifi and Rodriguez, 2002). One important contribution of the use of PSS is metaplanning (Campagna, 2013), which can be defined as the explicit design of the planning process. According to this concept, the key benefits of PSS are: to promote a better dialogue between planners and systems integrators; to help fully exploit of the GIS resources for more informed decision making and the promotion of a system that tracks the process from beginning to end supporting the cycle as a whole.

Several authors, as indicated by Geertman and Stillwell (2009), consider the PSS as a process able to improve the handling of knowledge and information on the actions of planning, a function that provides great assistance to those who are involved in handling the complexity ever-increasing task of territorial government.

PSS can both support planning processes and parts of the planning system. PSS allows "macro" visualization when displaying the allocation of actors and actions of urban planning. On the other hand it includes a more detailed visualization of components.

However, as Batty (2007) indicates, visualization "is now all important" and PSS can be a key in this way once this systems enable the access (even remotely) to the increasing data and number of stakeholders involved in planning process.

As Ramasubramania and Quinn (2006) points out, a successful visualization is an intentional design intended to evoke the cognitive relations and perceptions of the viewer. So, visualization has to be intended as an organized framework of data and information which can provide insights of planning problems by means of an intuitive language (Pensa, Masala & Lami, 2013). This language is defines by each visualization and, depending on its effectiveness, it can overcome cultural barriers, thus being more accessible also to non-expert people.

Furthermore, visualization can improve planning process also by mean of the anticipation of *possible landscapes* (Zyngier, 2012) providing structured visions for planning future development which are also shared between the different actors such as policy-makers, citizens, stakeholders and professionals involved in the planning actions. In this sense, visualization can increase the ability of citizens to make mental simulations, offering them the visual support for collecting ideas and solutions. In addition, visualization can enhance the transparency of the planning process, showing the effects of some specific choices on spatial configuration, policies or activities.

Urban planning tools that include visualization can benefit the public accessibility to information, bringing transparency within the decision process and combining the intuitive knowledge of participants with the information brought by staff and consultants. This generous availability of comprehensive and decoded information allow the public to make informed and confident decisions and enhance the planning process in a broader citizenship (Kwartler & Longo, 2008).

In conclusion, PSS and sDSS can really benefit from the use of visualization in the communication process. They show to be very important in shaping a city vision, but the use of a visual language proved to be essential for creating common perspectives and sharing information between a group of variegate people. Therefore, more efforts in including visual outputs in planning and decision support tools are recommended in order to increase the opportunities for creating awareness and knowledge building on stakeholders and citizens before choices are made.

3 SANTA LÚCIA AND VALE DO SERENO: THE COMPARISON OF TWO BRAZILIAN URBAN AREAS

The case study present great relevance for the Metropolitan Region of Belo Horizonte's (MRBH) environment in different and even contradictory levels. The selected areas are contiguous to woods and springs and they present relative conflicts regarding their use and legislation versus real-estate interests. The areas result under a great pressure and intensification of anthropic interventions, containing consolidated occupancy as well as areas in urban transition process, which are targets for entrepreneurs and environmental interest, in different proportions and distinct moments.

Two study areas are selected: Santa Lúcia, within the municipality of Belo Horizonte, and the neighborhood Vale do Sereno, in the Nova Lima municipality (figure 2). Once they correspond to different municipalities, their urban landscape is the result of different urban parameters and forms of land occupancy, presenting distinct histories and experiences of community participation in urban management and planning. Despite all

differences in physical terms, the neighborhoods selected are very similar. Firstly, their shape can be compared because they are morphologically located in valleys which resemble amphitheaters and are situated along the fringes of the Curral mountain range. Secondly, they are both characterized by a variegate amount of different functions and building typologies.

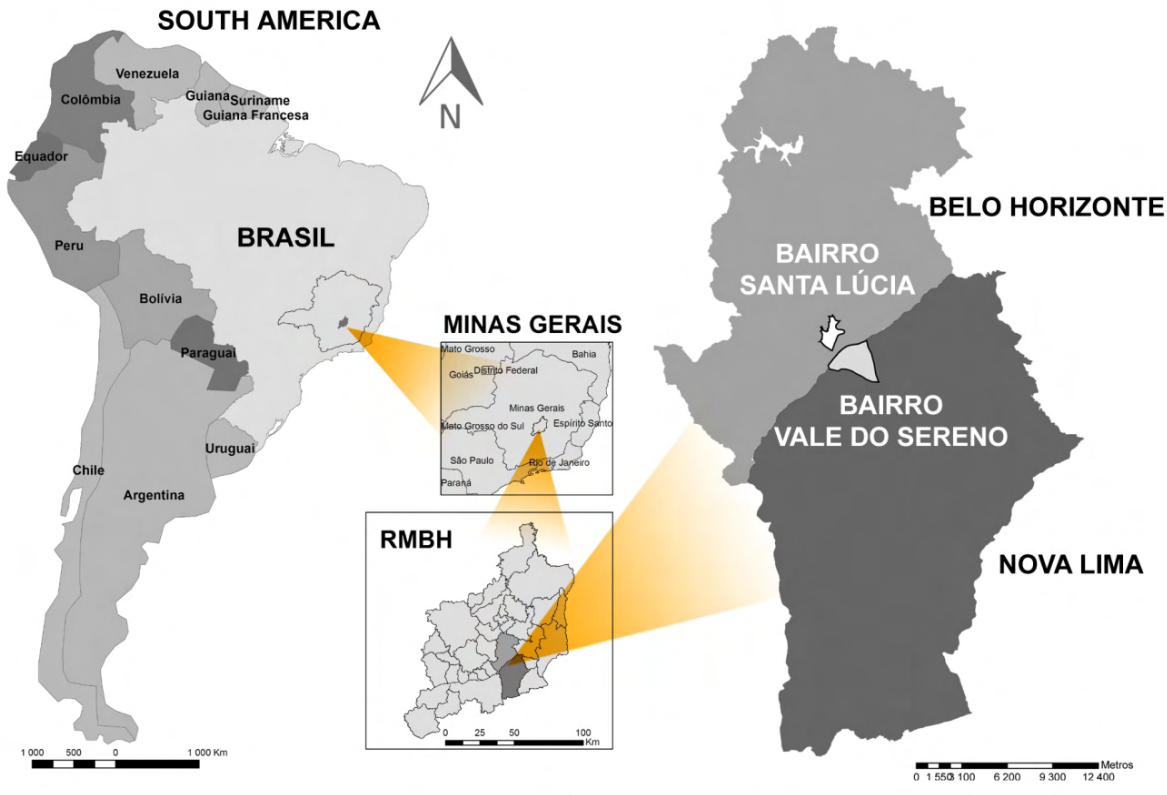

Fig. 2 Location of the pilot areas

In Santa Lúcia neighborhood, landscape is mainly constituted by:

- vacant areas and incomplete street layouts, mainly belonging to the neighborhood's original layout;
- buildings of 3 to 4 floors, with some exception reaching up to 10 floors, constructed before 1976, when Laws of Land Use and Occupancy (LLUO) have been established;
- single family residences of several typologies from the period previous to 1976's LLUO and up to present day, since there are constructions of this category ongoing in 2012;
- horizontal multifamily residences of recent construction;
- vertical multifamily buildings with several floors, implemented in several joint plots and resulting from LLUO of 1996;
- mixed and diverse use edifications, such as offices and galleries, resulting from 1996`s LLUO;
- consolidated verticalization throughout the Raja Gabáglia Avenue track and in parts of road BR356;
- areas undergoing approval evaluations for hotels and edifications related to municipal permits of 2010 - 2011, which are related to the World Cup which will take place in Brazil, 2014 (fig. 3).

Fig. 3 Partial view of Santa Lúcia neighborhood, 2011

Meanwhile, the landscape of Vale do Sereno neighborhood is shaped by (figures 4 and 5):

- vacant areas covered by extensive vegetation;
- large towers of mixed use, commercial and residential, in models of occupancy derived mainly from alterations promoted by 1993 to 1996 norms;
- single family residential buildings, probably built between 1993-1996 and with characteristics compatible with the original land plot division approved in the 1980's;
- a few examples of edifications originally intended as single family residences, but with current other functions;
- other outnumbered typologies, such as children schools or foundation head office.

The two areas have been studied to compare how norms have been communicated in order to build the urban landscapes.

Fig. 4 Neighborhood of Vale do Sereno and its surroundings, 2010

In the case of Santa Lúcia neighborhood, the first land plot division has marked the period 1928-1976, during which norms were communicated using simple texts, mainly available as decrees and laws issued by the municipality of Belo Horizonte. Nevertheless, a map made by Aarão Reis in 1895 guided the overall urban pattern, thus providing a visual expression to the city layout concept. However, over time, the content of the map has been altered by textual corrections which re-draft the boundaries of urban contours. The introduction in 1976 of the Laws of Land Use and Occupancy changed the approach to the planning of the city, implementing also communication methods.

Fig.5 Standard template pattern, permitted in 2007's Master Plan (illustration on the right) and the blind walls on the resulting buildings (pictures on the left)

The norms for Belo Horizonte, and consequently for Santa Lúcia neighborhood, was formatted as single volumes, containing parameters sketched in zoning maps for each area of the city. Some tables were also annexed in these volumes as a synthetic way of translating these parameters. Thanks to the development of Information Technology (IT), the municipality of Belo Horizonte implemented the accessibility to its normative documents, creating at the beginning of 2000's a digital version of the LLUO's printed version. However, although the distribution vehicle has been changed, the normative contents remain the same. No communication tools have been created for facilitating the access to the information included in the documents, so that no particular improvements can be noticed in promoting the awareness of both citizens and stakeholders on city's norms. On the other hand, some changes can be appreciated on data availability, due to internet promoting more visibility and accessibility to documentations.

For the area of Vale do Sereno, which is located in the municipality of Nova Lima, the first law on land use dates back to 1983 and it is completely textual, made by descriptions and annexed tables which resume all the urban parameters without providing any explanatory image. From the law of 1983 to the Master Plan of 2007, at least three others changes in normative have been established. In particular, in 1990 configuration, an expressive amount of overlaying alterations was observed, so that its decoding resulted very complex. These difficulties in reading normative made the creation of a vision for the growth of Vale do Sereno a hard challenge for both experts and non-experts. In 2007, the Municipality of Nova Lima released a Master Plan which included also a map and a table. This new documentation has been made available on the City Hall's webpage. However, as for the previous area in Belo Horizonte, the advance regarding the distribution vehicle has not been followed by any advance on the content or graphic information of the documentation.

To summarize the outcomes of this comparison, a small but sensible difference in information conveying, communicating and superposing is noted. However, for Vale do Sereno neighborhood, the superposition and

subdivision are clearly more expressive. This area suffered several changes regarding zoning in a short period of time, and without public audience's approval, reducing population ability to understand and follow up alterations. This type of conduction makes norm conveying difficult and provokes low accessibility to its content, thus restricting comprehension and democratic participation. Processes of devaluing private property – such as a house surrounded by tall buildings – as well as public property – such as landscape superposed by buildings, are not managed so that scenarios can constantly be changed without follow an overall and shared vision of the urban landscape (Zyngier, 2012).

In both areas, the urban fabric expands itself in a way that, not only its physical grids are superimposed (and contrasted), but also the resulting possible landscapes (Zyngier, 2012). This study confirms that the communication about urban parameters is still very limited and, consequently, also the landscape management by a community results very difficult. The lack of images showing an overall vision of the city, explaining the use of urban parameters and illustrating the combinations between urban indicators, functions and forms, causes hard difficulties in interpreting the normative and laws which should shape the city itself. The understanding of meaning of normative is for sure a starting point for investigating what is legally foreseen, but it is also a way for stakeholder to have a shared vision of the city they can commonly shape or re-shape.

In those areas, communication barriers are really intense yet, also because of misunderstandings from the community reinforce the conflict within neighborhood while, in some cases, reach opposition between different neighborhoods. Consequently, the atmosphere shifts from pressure inside the area, for instance, to ignorance regarding advancements made by vicinity neighborhoods when it comes to norms. The lack of dialogue regarding urban parameters communication to communities becomes a general issue which involves not only economic differences, but also social and cultural inequities.

4 CONCLUSIONS

The urban planning is considered a complex disciplines because it involves not only the physical three-dimensional space, but it aims at combining and integrating different quantitative and qualitative aspects which have strong consequences on the quality of life of citizens. Supporting urban planning is therefore a duty to achieve a better general quality in everyday activities.

The analysis of two different areas showed that the use of visual support can improve the accessibility of both experts and non-experts people to the information included within the normative documentation which should give a form to our cities. Visual outputs help in overcoming cultural, social and geographical barriers providing a common vision for sharing ideas, perspectives and targets. In this sense, PSS and sDSS should be a support for the cognitive process of individuals, offering not solutions as a crystal ball for forecasting a future will never come, but visions of a common future. Although PSS and sDSS are not used yet in the case study areas, the analysis shows that the lack of communication between official planning and citizens is a question which needs a quick and effective answer. Cities are knowing a very fast growth which should be controlled, not only to preserve landscape quality, but to offer an adequate, sustainable and smart living to their citizens.

Information technology currently offers many tools for sharing opinions, so PSS and sDSS can take many advantages in their use. The use of visual languages is open enough to be understood by communities, including the group of technical and non-technical people. Nevertheless, although IT can provide adequate instruments , many improvements are required to build the communication process between people, so to generate interaction among the different involved actors, such as public, private or professional

stakeholders. In particular, the planning process needs to shift up its communication value, intending communication no more as a mere presentation of a project, but as a strong part of the process itself. The massive use of visual language could enhance the participation and knowledge building for all the people who is interested in taking part to the planning process.

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IMAGES SOURCES

Fig. 1: Adapted from van Wijk (2005).

Fig. 2: Zyngier (2012).

Fig. 3: Author's archive.

Fig. 4: Author's archive.

Fig.5: Zyngier (2012) (to the right) and Ana Clara Moura´s personal archive (to the left)

AUTHORS' PROFILE

Camila Zyngier

Graduated in Architecture and Urbanism, Master Degree in Architecture and Urbanism, and is a Ph.D. student at the School of Architecture of the Federal University of Minas Gerais (UFMG). Has experience in GIS applications for Urban Analysis and Urban Planning. Currently is teaching at Methodist Institute Izabela Hendrix, school of Architecture and Urban Planning. She is a member of the Project "Parametric Modeling of Territorial Occupation: proposal of new resources of geo-technologies to represent and plan the urban territory", with the support of CNPq – National Council for the Scientific and Technological Development - Call MCTI/CNPq/MEC/CAPES Nº 43/2013, Process: 405664/2013-3. Since 2010 the author works in her Architectural Office.

Stefano Pensa

Stefano Pensa has completed his PhD in Architecture and Building Design in 2013, with a thesis concerning the use of geovisualization tool as a support for spatial planning and decision-making processes. He currently works as a researcher at SiTI - Higher Institute on Territorial Systems for Innovation, Torino (IT), where he carries out applied research and works at several European projects. His scientific interests range from the visualisation of spatial data to interactive systems, from web mapping to VGI. He also actively participates to a number of COST Actions. He is author of several national and international publications and he has been an invited speaker to a number of workshops.

Elena Masala

PhD in Architecture, in 2003 Elena Masala starts working as Research Fellow at Politecnico di Torino (Italy). Since 2010, she carries out her activity at SiTI - Higher Institute on Territorial Systems for Innovation, in the research field of geovisualization. Her experience ranges from 3D modeling to video animations, from Geographic Information Systems (GIS) to interactive visualisations, with a strong experience on virtual environments. Her work aims at supporting spatial planning and decision-making processes by means of visual analysis, data exploration and communication. Her activity focuses on the usability of Planning and spatial Decision Support Systems (PSS and sDSS) to be applied in the operational research. She takes part to some COST Actions and she is author of several publications on both national and international books and journals.